

### ABSTRACT

A sparging system for in-situ groundwater remediation for removal of contamination including dissolved chlorinated hydrocarbons and dissolved hydrocarbon petroleum products including the use in injection wells of microfine bubble generators, matched to substrates of selected aquifer regions, for injection and distribution of said bubbles containing oxidizing gas through said aquifer and to selectively encapsulating gases including oxygen and ozone in duo-gas bubbles which, in the presence of co-reactant substrate material acting as a catalyst, are effective to encourage biodegradation of leachate plumes which contain biodegradable organics, or Criegee decomposition of leachate plumes containing dissolved chlorinated hydrocarbons.

20364141.doc